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(54) **POOL VACUUM**

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***E04H 4/16*** (2006.01)

(52) **U.S. Cl.**
CPC ..... ***E04H 4/1645*** (2013.01)

(58) **Field of Classification Search**
CPC . E04H 4/1636; E04H 4/1645; E04H 4/1654; E04H 4/1672
See application file for complete search history.

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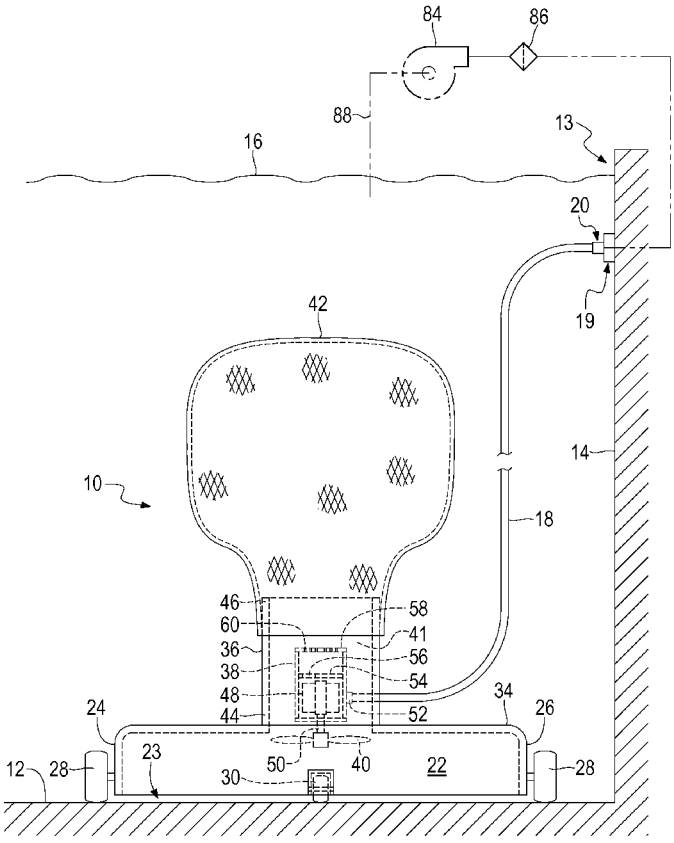
(57) **ABSTRACT**

Method and apparatus for a pool vacuum having a wheeled vacuum head having an internal rotating impeller driven by water pressure from a hose connected to the water return inlet of the pool wherein the internal impeller shares a common shaft with a propeller extending into the vacuum head so that the impeller turns the propeller which in turn creates a powerful, upward water flow which will lift leaves, debris and trash from the bottom of the pool upwardly through a housing and into a filter mounted on the upper end portion of the pool vacuum.

**10 Claims, 3 Drawing Sheets**



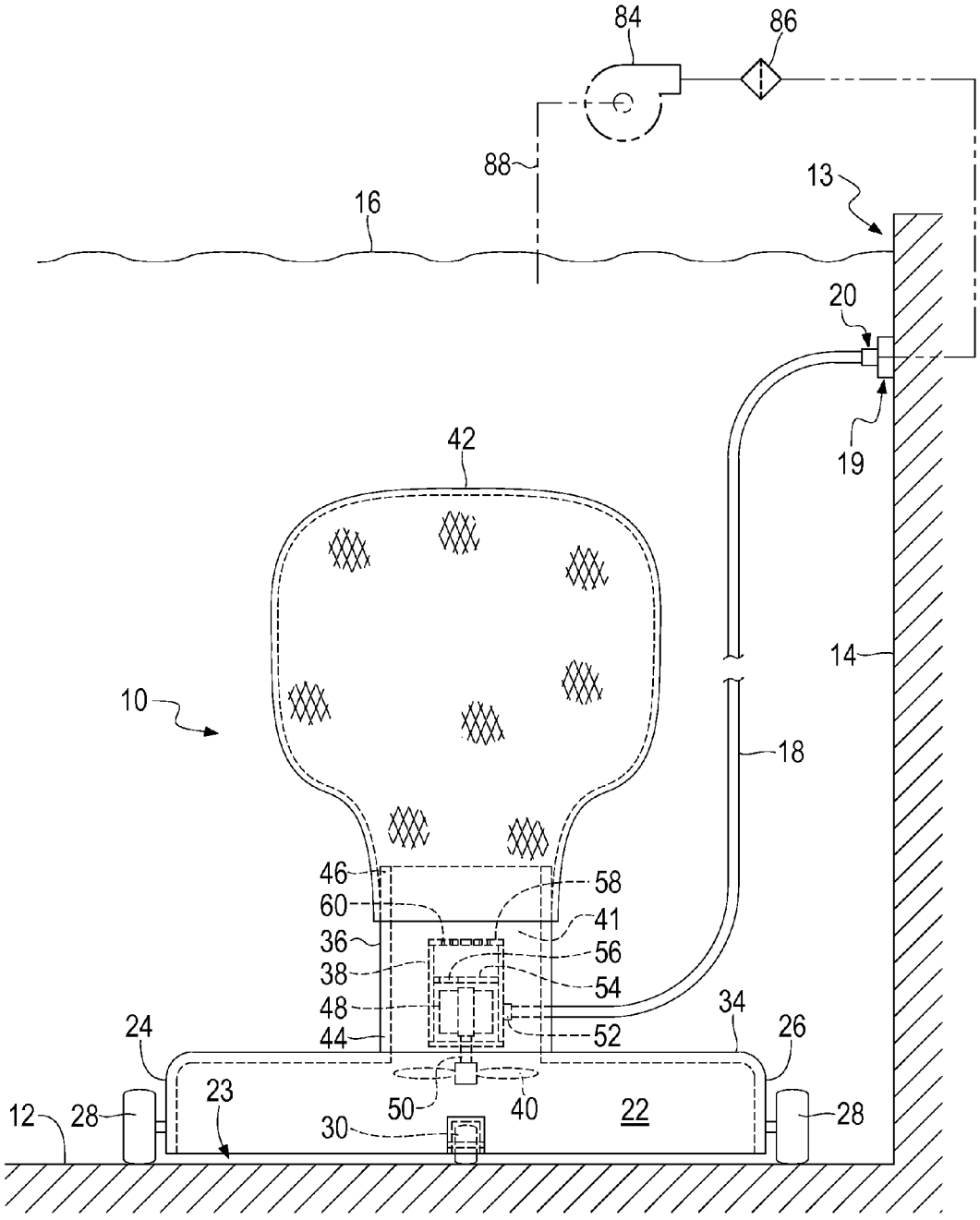

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FIG. 1

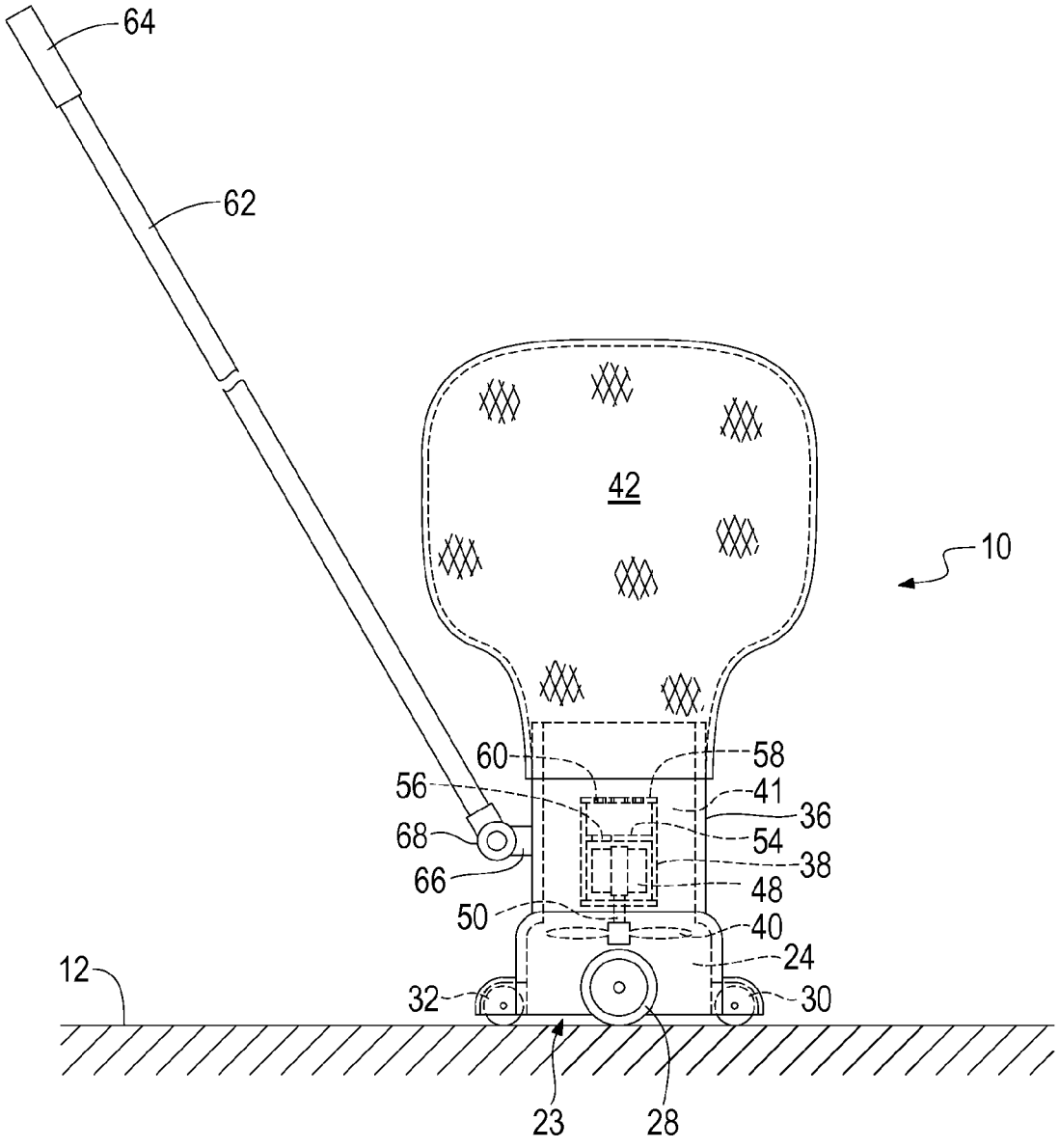


FIG. 2

FIG. 3

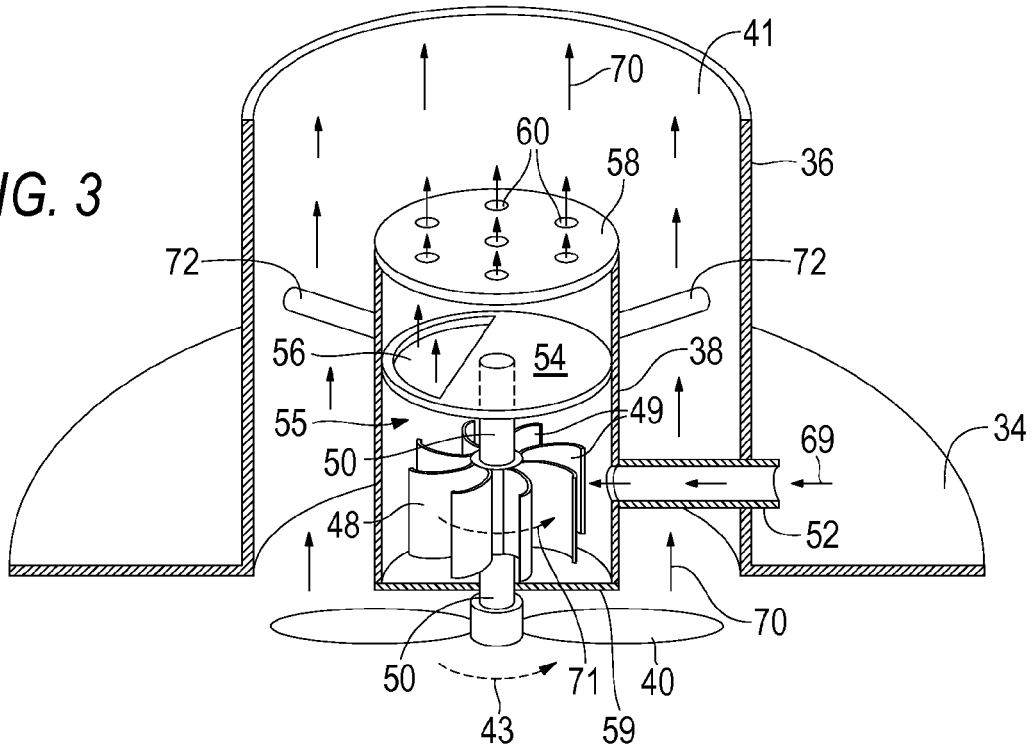
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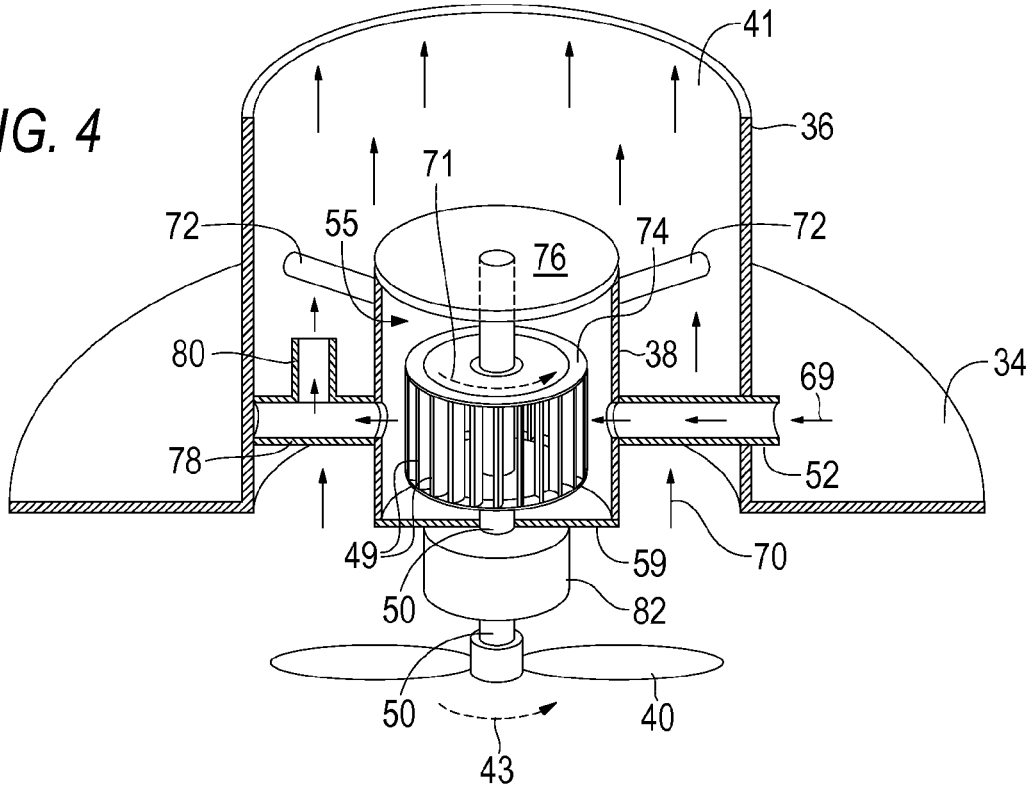
FIG. 4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# POOL VACUUM

## BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to swimming pool accessories and, more particularly, is concerned with a pool vacuum.

2. Description of the Related Art

Devices relevant to the present invention have been described in the related art, however, none of the related art devices disclose the unique features of the present invention.

In U.S. Pat. No. 7,165,284 dated Jan. 23, 2007, Erlich, et al., disclosed a water jet reversing propulsion and directional controls for automated swimming pool cleaners. In U.S. Pat. No. 3,972,339 dated Aug. 3, 1976, Henkin, et al., disclosed an automatic swimming pool cleaner. In U.S. Pat. No. 6,942,790 dated Sep. 13, 2005, Dolton disclosed an open air filtration cleaning device for pools and hot tubs. In U.S. Pat. No. 6,782,578 dated Aug. 31, 2004, Rief, et al., disclosed a swimming pool pressure cleaner with internal, steering mechanism. In U.S. Pat. No. 5,933,899 dated Aug. 10, 1999, Campbell, et al., disclosed a low pressure, automatic swimming pool cleaner. In U.S. Pat. No. 8,402,585 dated Mar. 26, 2013, Rief, et al., disclosed a convertible pressure/suction swimming pool cleaner. While these devices may be suitable for the purposes for which they were designed, they would not be as suitable for the purposes of the present invention as hereinafter described.

## SUMMARY OF THE PRESENT INVENTION

The present invention discloses a pool vacuum for removing leaves, trash and other debris from a swimming pool in a highly efficient manner. The pool vacuum comprises a wheeled vacuum head having an internal rotatable impeller driven by water pressure conveyed through a hose connected to the water return inlet of the pool wherein the internal impeller shares a common depending shaft with a propeller extending into the vacuum head so that the impeller turns the propeller so as to create a powerful, upward water flow which will lift leaves, debris and trash from the bottom of the pool up through a housing and into a filter mounted on the upper end portion of the pool vacuum. The impeller is mounted inside an impeller housing having a depending shaft extending downwardly upon which the propeller is mounted. The outward water flow from the impeller housing is also directed upwardly through a separator plate and top portion having a plurality of discharge ports thereon to provide additional water flow upwardly toward the filter. A handle is provided on the pool vacuum so that a user can manually move the pool vacuum about the interior surfaces of the swimming pool.

An object of the present invention is to provide an improved pool vacuum for a swimming pool. A further object of the present invention is to provide a pool vacuum driven by water pressure from the return inlet water hose which water flow is caused by water pressure from the pump of the pool which water pressure is otherwise wasted. A further object of the present invention is to provide a more powerful pool cleaner for lifting difficult to remove items from the pool. A further object of the present invention is to provide a pool cleaner which is relatively easy to use. A further object of the present invention is to provide a pool cleaner which can be relatively inexpensively and easily manufactured.



The foregoing and other objects and advantages will appear from the description to follow. In the description reference is made to the accompanying drawings, which form a part hereof, and in which is shown by way of illustration specific embodiments in which the invention may be practiced. These embodiments will be described in sufficient detail to enable those skilled in the art to practice the invention, and it is to be understood that other embodiments may be utilized and that structural changes may be made without departing from the scope of the invention. In the accompanying drawings, like reference characters designate the same or similar parts throughout the several views.

The following detailed description is, therefore, not to be taken in a limiting sense, and the scope of the present invention is best defined by the appended claims.

## BRIEF DESCRIPTION OF THE DRAWINGS

In order that the invention may be more fully understood, it will now be described, by way of example, with reference to the accompanying drawings in which:

FIG. **1** is a front elevation view of the present invention.

FIG. **2** is a side elevation view of the present invention.

FIG. **3** is a perspective view of the inner housing of the present invention showing one embodiment of the present invention.

FIG. **4** is a perspective view of the inner housing of the present invention showing a second embodiment of the present invention.

## LIST OF REFERENCE NUMERALS

With regard to reference numerals used, the following numbering is used throughout the drawings.

**10** present invention
**12** bottom of pool
**13** swimming pool
**14** side of pool
**16** water surface
**18** return inlet hose
**19** return inlet
**20** connection to return inlet
**22** vacuum head
**23** suction opening
**24** right side
**26** left side
**28** side wheel
**30** front wheel
**32** rear wheel
**34** deck
**36** outer housing
**38** inner housing
**40** propeller
**41** interior space
**42** filter
**43** direction arrow
**44** lower end
**46** upper end
**48** impeller
**49** blades
**50** shaft of impeller
**52** water inlet
**54** separator plate
**55** chamber
**56** discharge port
**58** top

**59** bottom
**60** discharge port
**62** handle
**64** hand grip
**66** connecting point
**68** pivoting attachment
**69** pressurized water supply flow
**70** direction arrow
**71** direction arrow
**72** mounting bracket
**74** squirrel cage impeller
**76** top
**78** horizontal outlet
**80** vertical outlet
**82** gear assembly
**84** pump
**86** fitter
**88** inlet line

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

The following discussion describes in detail at least one embodiment of the present invention. This discussion should not be construed, however, as limiting the present invention to the particular embodiments described herein since practitioners skilled in the art will recognize numerous other embodiments as well. For a definition of the complete scope of the invention the reader is directed to the appended claims. FIGS. **1** through **4** illustrate the present invention wherein a pool vacuum is disclosed and which is generally indicated by reference number **10**.

Turning to FIG. **1**, therein is shown the present invention **10** wherein a pool vacuum is shown cleaning the bottom **12** of a swimming pool **13** having sides **14** and a water surface **16** along with a return inlet hose **18** which is returned water pumped into the pool from the pool pump. The present invention **10** is shown using the inlet hose **18** being connected at **20** to the return inlet **19** on the side **14** of the pool **13**. The present invention **10** has vacuum head **22** on its lower end having left and right side portions **26**, **24** each having a side wheel **28** thereon along with front and rear wheels **30**, **32**, best shown in FIG. **2**. The vacuum head **22** has an upper deck or surface **34** upon which is mounted a larger, outer housing **36** which is hollow on the inside containing an inner housing **38** along with a propeller **40** near its lower intake end. The interior of the outer housing **36** provides a inner water flow conduit **41** extending from the interior of the vacuum head to the upper filter **42** which may be a mesh bag. The lower end **44** of the outer housing **36** is mounted onto the surface of the deck **34** and the filter **42** is attached to the upper end **46** of the outer housing. Contained inside the outer housing **36** is an inner housing **38** containing an impeller **48** therein which may be a rotary impeller of various types mounted onto an upper end of a shaft **50** and having the propeller **40** connected to its lower end wherein the impeller (best seen in FIG. **3**) is driven by the high pressure water flow of the return inlet hose **18** which connects to the inner housing at inlet **52**. Also shown inside the inner housing **38** is a separator plate **54** above the impeller **48** having a discharge port **56** in the separator plate **54** and a top **58** having a plurality of discharge ports **60** therein. It would be clear to one skilled in the an that the impeller **48** is turned on its shaft **50** by water carried through the inlet hose **18** which in turn rotates the propeller **40** on shaft **50** creating an upward flow of water from the interior of vacuum head **22** upwardly to the filter **42**. Also, water flow exits the inner housing **38** through the discharge port **56** in the separator plate **54** and the multiple discharge ports **60** of the top of the inner housing. Also, shown in phantom line for illustration only, is a pool pump **84** and filter **86** receiving water from swimming pool **14** through inlet line **88** and returning water to the swimming pool through the return inlet **19** as would be done in the standard manner by one skilled in the art.

Turning to FIG. **2**, therein is shown the present invention **10** wherein a pool vacuum is shown cleaning the bottom **12** of a swimming pool **13** having sides **14** and a water surface **16** along with a return inlet hose **18** which is returned water pumped into the pool from the pool pump. The present invention **10** is shown using the inlet hose **18** being connected at **20** to the return inlet **19** on the side **14** of the pool **13**. The present invention **10** has vacuum head **22** on its lower end having left and right side portions **26**, **24** each having a side wheel **28** thereon along with front and rear wheels **30**, **32**, best shown in FIG. **2**. The vacuum head **22** has an upper deck or surface **34** upon which is mounted a larger, outer housing **36** which is hollow on the inside containing an inner housing **38** along with a propeller **40** near its lower intake end. The interior of the outer housing **36** provides a water flow conduit **41** extending from the interior of the vacuum head to the upper filter **42** which may be a mesh bag. The lower end **44** of the outer housing **36** is mounted onto the surface of the deck **34** and the filter **42** is attached to the upper end **46** of the outer housing. Contained inside the outer housing **36** is an inner housing **38** containing an impeller **48** inside which may be a rotary impeller of various types mounted onto an upper end of a shaft **50** and having the propeller **40** connected to its lower end wherein the impeller (best seen in FIG. **3**) is driven by the high pressure water flow shown by arrow **69** and conveyed through the inlet hose **18** which connects to the inner housing at inlet **52**. Also shown inside the inner housing **38** is a separator plate **54** above the impeller **48** having a discharge port **56** in the separator plate **54** and a top **58** having a plurality of discharge ports **60** therein. It would be clear to one skilled in the an that the impeller **48** is turned on its shaft **50** by water carried through the inlet hose **18** which in turn rotates the propeller **40** on shaft **50** creating an upward flow of water from the interior of vacuum head **22** upwardly to the filter **42**. Also, water flow exits the inner housing **38** through the discharge port **56** in the separator plate **54** and the multiple discharge ports **60** of the top of the inner housing. Also shown is handle **62** having an upper hand grip **64** being connected to rear of the outer housing **36** of the pool vacuum **10** at a connection point **66** and also showing the handle having an angularly pivoting attachment **68**. Other previously disclosed elements may also be shown.

Turning to FIG. **3**, therein is shown the outer housing **36** mounted onto a portion of the deck **34** containing the inner housing **34** therein and having the impeller **48** therein mounted on a shaft **50** showing the propeller **40** on its lower end along with a direction arrow **43** showing rotation of propeller and direction arrows **70** showing the direction of the water flow created by the rotation of the propeller **40**. Water from the inlet hose (not shown, but see item **18**. FIG. **1**) connected to inlet **52** is directed across the impeller **48** so as to cause it to rotate as shown by direction arrow **71** which in turn turns the propeller **40** as previously disclosed wherein the water from the interior of the inner housing **38** travels upwardly through a discharge port **56** of the separator plate **54** and then out through the discharge ports **60** of the top **58**. Also shown are a plurality of spaced apart mounting

brackets **72** which secure the inner housing **38** to the interior of the outer housing **36**. Other previously disclosed elements may also be shown.

Turning to FIG. **4**, therein is shown the outer housing **36** mounted onto a portion of the deck **34** containing the inner housing **34** therein and having the impeller **48** therein mounted on a shaft **50** showing the propeller **40** on its lower end along with a direction arrow **43** showing rotation of propeller and direction arrows **70** showing the direction of the water flow created by the rotation of the propeller **40**. Water from the inlet hose (not shown, but see item **18**, FIG. **1**) connected to inlet **52** is directed across the impeller **48** so as to cause it to rotate as shown by direction arrow **71** which in turn turns the propeller **40** as previously disclosed wherein the water from the interior of the inner housing **38** travels upwardly through a discharge port **56** of the separator plate **54** and then out through the discharge ports **60** of the top **58**. Also shown are a plurality of spaced apart mounting brackets **72** which secure the inner housing **38** to the interior of the outer housing **36**. Also shown is a squirrel cage type impeller **74** which could be used in place of the conventional open blade or vane type impeller **48** previously shown. Either of the impellers **48**, **74** could be used depending on the design choice of the builder. Also shown is a top **76** of the inner housing **38** having no discharge ports as with the previously disclosed embodiment but instead having a discharge outlet **78** passing laterally from the side of the inner housing **38** and then out the outlet **80** in an upward direction wherein the discharge **78** also acts as an additional brace similar to previously disclosed brace **72** for securing the inner housing **38** to the wall of the outer housing **36**. Also shown is an optional conventional gear assembly or transmission **82** which would provide a mechanical advantage to the impeller **48**, **74** so as to provide increased torque for turning the propeller **40**. Other previously disclosed elements may also be shown.

Direction arrows shown in FIGS. **1-4** are used throughout this specification to show direction of water flow, movement, or other activity/action described herein.

By way of further explanation and by reference to FIGS. **1-4** the following summary is provided of the present invention **10** which includes a pool vacuum for cleaning the bottom and side wall surfaces **12**, **14** of a swimming pool **13**, the swimming pool having a water pump **84** for removing water from the swimming pool and returning a pressurized water supply flow to the swimming pool through a water return inlet **19** including the following: a) at a vacuum head **22**, a plurality of wheels **28**, **30**, **32** disposed on the vacuum head so that the vacuum head can be rolled about in the swimming pool, the vacuum head being configured to have a suction opening **23** at a bottom portion thereof proximate a surface of the swimming pool; b) a rotary impeller **48**, the rotary impeller having a plurality of blades **49** thereon and a shaft **50** depending therefrom and extending into the vacuum head, wherein the shaft is turned by the rotary impeller; c) wherein the rotary impeller is driven by the pressurized water supply flow **69** from the water return inlet of the swimming pool; d) a propeller **40** is disposed on the shaft so that the propeller rotates in response to rotation of the rotary impeller, wherein rotation of the propeller causes an upward flow of water **70** through the suction opening and the vacuum head so that debris is removed from the bottom and side wall surfaces of the swimming pool; e) a filter **42** is disposed on the pool vacuum for collecting debris removed by the upward flow of water; and, f) an elongated handle **62** is disposed on the pool vacuum so that the pool vacuum can be moved about by a user. Furthermore, an outer housing **36** is disposed on the vacuum head, the outer housing having an upper **46** and a lower end **44** portion, wherein the lower end is disposed on the vacuum head, wherein the filter is disposed on the upper end of the outer housing, wherein the outer housing has an interior space **41** therein so the upward flow of water passes through the interior space from the vacuum head to the filter. Furthermore, an inner housing **38** is disposed inside the outer housing, wherein the rotary impeller is disposed inside the inner housing, the inner housing having upper **58** and lower end **59** portions. Furthermore, a separator plate **54** is disposed inside the inner housing so as to form a chamber **55** containing the rotary impeller, a water inlet **52** disposed on the chamber for receiving the pressurized water supply flow from the water return inlet so that the rotary impeller is driven by the pressurized water supply flow from the water return inlet of the swimming pool. Furthermore, a hose **18** having one end connected at **20** to the water return inlet of the swimming pool and a second end connected to the water inlet **52** on the chamber delivers water from the water return inlet to the water inlet on the chamber of the inner housing so that the rotary impeller is driven by the pressurized water supply flow from the water return inlet of the swimming pool. Furthermore, the said separator plate has a discharge port **56** therein to permit pressurized water to escape from the chamber and the upper end portion of the inner housing has a plurality of discharge ports **60** therein to permit pressurized water to escape from the chamber so that water passing through the discharge ports is directed toward the filter to provide additional upward flow of water to the filter. Furthermore, in an alternate embodiment, a water outlet **78** may extend laterally from the chamber, wherein the water outlet is configured to provide an upwardly directed stream of water at **80** directed toward the filter to provide additional upward flow of water to the filter as shown by the direction arrows.

I claim:

**1**. A method for vacuuming the bottom and side wall surfaces of a swimming pool, the swimming pool having a water pump for removing water from the swimming pool and returning a pressurized water supply flow to the swimming pool through a water return inlet, comprising the steps of:

a) providing a vacuum head having a plurality of wheels thereon so that the vacuum head can be rolled about in the swimming pool, the vacuum head being configured to have a suction opening at a bottom portion thereof proximate a surface of the swimming pool;

b) providing a rotary impeller thereon and a shaft depending therefrom and extending into the vacuum head, wherein the shaft is rotated by the rotary impeller;

c) driving the rotary impeller with the pressurized water supply flow from the water return inlet of the swimming pool;

d) creating an upward flow of water through the suction opening and the vacuum head in response to rotation of a propeller disposed on the rotating shaft so that debris is removed from the bottom and side wall surfaces of the swimming pool;

e) filtering debris from the upward flow of water; and,

f) moving the pool vacuum around the swimming pool.

**2**. The method of claim **1**, further comprising the step of disposing an outer housing on the vacuum head, the outer housing having an upper and a lower end portion, wherein the lower end is disposed on the vacuum head, wherein the filter is disposed on the upper end of the outer housing, wherein the outer housing has an interior space therein so

that the upward flow of water passes through the interior space from the vacuum head to the filter.

**3**. The method of claim **2**, further comprising the step of disposing an inner housing inside the outer housing, wherein the rotary impeller is disposed inside the inner housing, the inner housing having upper and lower end portions.

**4**. The method of claim **3**, further comprising the step of disposing a separator plate inside the inner housing so as to form a chamber containing the rotary impeller, a water inlet disposed on the chamber for receiving the pressurized water supply flow from the water return inlet so that the rotary impeller is driven by the pressurized water supply flow from the water return inlet of the swimming pool.

**5**. The method of claim **4**, further comprising the step of providing a hose having one end connected to the water return inlet of the swimming pool and a second end connected to the water inlet on the chamber for delivering water from the water return inlet to the water inlet on the chamber of the inner housing so that the rotary impeller is driven by the pressurized water supply flow from the water return inlet of the swimming pool.

**6**. The method of claim **5**, wherein the separator plate has a discharge port therein to permit pressurized water to escape from the chamber.

**7**. The method of claim **6**, wherein the upper end portion of the inner housing has a plurality of discharge ports therein to permit pressurized water to escape from the chamber so that water passing through the discharge ports is directed toward the filter to provide additional upward flow of water to the filter.

**8**. The method of claim **4**, further comprising the step of providing a water outlet extending laterally from the chamber, wherein the water outlet is configured to provide an upwardly directed stream of water directed toward the filter to provide additional upward flow of water to the filter.

**9**. The method of claim **1**, wherein the rotary impeller comprises a squirrel cage impeller.

**10**. The method of claim **1**, further comprising the step of providing a gear assembly between the rotary impeller and the propeller to provide a mechanical advantage to the rotary impeller for turning the propeller.

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